


In the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A user interface operable to create, on a display device, a window for displaying a plurality of menu editor items for user selection, said menu editor items comprising:

 a sequence editor item for creating a pulse sequence from at least one value; and

a sequence tailor editor item for user interaction with a graphical representation of a selected pulse sequence, wherein during said user interaction, the selected pulse sequence is graphically displayed to the user,

wherein said user interaction includes dynamic manipulation of and modification to said graphical representation of said selected pulse sequence, and real time visual feedback to the user of the manipulated pulse sequence.

2. (Original) The user interface in accordance with claim 1, wherein said sequence tailor editor item is activated in response to user selection.

3. (Original) The user interface in accordance with claim 1, wherein user selection of said sequence editor item activates a display of at least one sequence parameter for creating said pulse sequence, said at least one sequence parameter being operable to accept a default value.

4. (Original) The user interface in accordance with claim 3, wherein said at least one sequence parameter is operable to accept a user entered value.

5. (Original) The user interface in accordance with claim 3, wherein said at least one sequence parameter is selected from the group consisting of: a gradient resolution

parameter, a radio frequency pulse resolution parameter, a echo gathering time parameter, a sequence name parameter, at least one gradient motion compensation parameter, at least one radio frequency pulse characteristic parameter, and at least one data acquisition parameter.

6. (Original) The user interface in accordance with claim 3, wherein acceptance, by the user interface, of the at least one sequence parameter activates said sequence tailor editor item.

7. (Original) The user interface in accordance with claim 1, wherein activation of said sequence tailor editor item activates display of said pulse sequence and at least one control feature.

8. (Original) The user interface in accordance with claim 7, wherein said at least one control feature comprises at least one of a control section, a shape editor, a block editor, and a time scaler.

9. (Original) The user interface in accordance with claim 8, wherein said shape editor, when activated, is operable to modify at least one radio frequency pulse characteristic parameter and the radio frequency pulse shape associated with said selected pulse sequence.

10. (Original) The user interface in accordance with claim 8, wherein said time scaler, when activated, displays at least one vertical line through the graphically displayed selected pulse sequence for assisting the user in analysis of timing relations of the pulse sequence.

11. (Original) The user interface in accordance with claim 1, wherein said graphical representation within said window on said display device is divided into a plurality of portions.

12. (Original) The user interface in accordance with claim 11, wherein said plurality of portions comprises at least one of a radio frequency pulse characteristics graph, a slice select gradient graph, a signal acquisition graph, and a phase encoding graph.

13. (Original) The user interface in accordance with claim 1, wherein said menu editor items within said window further comprise a scan setting menu editor item for initiation of a magnetic resonance imaging scan.

14. (Original) The user interface in accordance with claim 13, wherein selection of said scan setting menu editor item displays at least one type of scan to perform.

15. (Original) The user interface in accordance with claim 14, wherein said at least one type of scan comprises at least one scan selected from the group consisting of: a two dimensional scan, a combination scan, a three dimensional scan, a three dimensional combination scan, a two dimensional fast spin echo scan, and combinations thereof.

16. (Original) The user interface in accordance with claim 14, wherein said type of scan, when activated, displays at least one setting imaging parameter, said setting imaging parameter being operable to accept at least one default value.

17. (Original) The user interface in accordance with claim 16, wherein said at least one setting imaging parameter is operable to accept at least one user-entered value.

18. (Original) The user interface in accordance with claim 16, wherein said at least one setting imaging parameter is selected from the group consisting of: a number of slices parameter, a slice thickness parameter, a sequence repetition parameter, a number of phase encoding levels parameter, a discrete Fourier transform size parameter, a polarity flipping parameter, and combinations thereof.

19. (Currently Amended) A method for creation and customization of pulse sequences, said method comprising the steps of:

creating a window on a display device for displaying a plurality of menu editor items for user selection;

displaying a sequence editor item for creating a pulse sequence from at least one of user-entered values and default values;

displaying a sequence tailor editor item for user interaction with a graphical representation of a selected pulse sequence; and

displaying, graphically, said pulse sequence to the user,

wherein said user interaction includes dynamic manipulation of and modification to said graphical representation of said selected pulse sequence, and real time visual feedback to the user of the manipulated pulse sequence.

20. (Original) The method in accordance with claim 19, wherein said creating step further comprises the step of:

displaying a scan setting menu editor item for initiation of a magnetic resonance imaging scan.

21. (Original) The method in accordance with claim 20, wherein, upon initiation of said magnetic resonance imaging scan, said method further comprises the step of:

initiating at least one of a two dimensional scan, a two dimensional combination scan, a three dimensional scan, a three dimensional combination scan, and a two dimensional fast spin echo scan.

22. (Original) The method in accordance with claim 19, further comprising the step of:

dividing said graphical representation within said window on said display device into a plurality of portions.

23. (Original) The method in accordance with claim 22, wherein said step of dividing further comprises the step of dividing said graphical representation into at least one of a radio frequency pulse characteristics graph, a slice select gradient graph, a signal acquisition graph, and a phase encoding graph.

24. (Original) The method in accordance with claim 19, said method further comprising the steps of:

initiating a magnetic resonance imaging scan by activating a scan setting menu editor item within said window on said display device; and

displaying at least one setting imaging parameter.

25. (Original) The method in accordance with claim 19, said method further comprising the steps of:

displaying, in response to selection of said sequence editor item, at least one sequence parameter for creating said pulse sequence; and

accepting, by said at least one sequence parameter, at least one of said default values.

26. (Original) The method in accordance with claim 25, wherein said step of accepting further comprises the step of:

accepting, by said at least one sequence parameter, at least one of said user-entered values.

27. (Original) The method in accordance with claim 26, wherein said step of displaying said at least one sequence parameter further comprises the step of:

displaying at least one additional parameter, said additional parameter selected from the group consisting of:

a gradient resolution parameter, a radio frequency pulse resolution parameter, an echo gathering time parameter, a sequence name parameter, a plurality of gradient motion compensation parameters, a plurality of radio frequency pulse parameters, and a plurality of data acquisition parameters.

28. (Original) The method in accordance with claim 26, said method further comprising the step of:

activating said sequence tailor editor item by at least one of user selection and a response to said step of accepting of said at least one sequence parameter by a user interface.

29. (Original) The method in accordance with claim 28, said method further comprising the step of:

displaying the selected one of said pulse sequences and at least one control feature for at least one of plot modification and plot enhancement.

30. (Original) The method in accordance with claim 29, wherein said step of displaying further comprises the step of:

displaying at least one of a control section, a shape editor, a block editor, and a time scaler.

31. (Original) The method in accordance with claim 30, wherein said step of displaying at least one of a control section, a shape editor, a block editor, and a time scaler further comprises the steps of:

activating said shape editor; and

modifying at least one of the radio frequency pulse characteristic parameters and the radio frequency pulse shape associated with said pulse sequence.

32. (Original) The method in accordance with claim 30, wherein said step of displaying at least one of a control section, a shape editor, a block editor, and a time scaler further comprises the steps of:

activating said time scaler; and

displaying at least one vertical line through the graphically displayed pulse sequence for assisting the user in analysis of timing relations of the pulse sequence.

33. (Original) The method in accordance with claim 30, wherein said step of displaying further comprises the step of :

displaying at least one of a number of slices parameter, a slice thickness parameter, a sequence repetition parameter, a number of phase encoding levels parameter, a discrete Fourier transform size parameter, and a polarity flipping parameter.

34. - 45. (Canceled)

New claims 46-70 are added herein:

46. (New) A display interface for creating a sequence used on a magnetic resonance imaging machine, displaying multiple windows receiving input from a user, said multiple windows comprising:

a sequence parameters window displaying at least one sequence parameter;

a sequence tailor window displaying at least one control;

a sequence display window having a section displaying at least one of the group consisting of: radio frequency characteristics of said sequence, a slice select gradient graph, a signal acquisition graph, and a phase encoding graph; and

a scan settings window having at least one scan parameter,
wherein user interaction with a pulse sequence formed by said user from said multiple windows includes dynamic manipulation of and modification to a graphical representation of said pulse sequence, and real time visual feedback to the user of the manipulated pulse sequence.

47. (New) The display interface in accordance with claim 46, wherein said at least one sequence parameter is operable to accept a default value.

48. (New) The display interface in accordance with claim 46, wherein said at least one sequence parameter is operable to accept a user entered value.

49. (New) The display interface in accordance with claim 46, wherein said at least one sequence parameter is selected from the group consisting of: a gradient resolution parameter, a radio frequency pulse resolution parameter, an echo gathering time parameter, a sequence name parameter, at least one gradient motion compensation parameter, at least one radio frequency pulse characteristic parameter, and at least one data acquisition parameter.

50. (New) The display interface in accordance with claim 46, wherein said at least one control comprises at least one of a control section, a shape editor, a block editor, and a time scaler.

51. (New) The display interface in accordance with claim 50, wherein said shape editor is operable to modify at least one radio frequency pulse characteristic parameter and the radio frequency pulse shape associated with said sequence.

52. (New) The display interface in accordance with claim 50, wherein said time scaler displays at least one vertical line through the graphically displayed selected pulse sequence for assisting the user in analysis of timing relations of the pulse sequence.

53. (New) The display interface in accordance with claim 46, wherein said at least one scan parameter is selected from the group consisting of: a number of slices parameter, a slice thickness parameter, a sequence repetition parameter, a number of phase encoding levels parameter, a discrete Fourier transform size parameter, a polarity flipping parameter, and combinations thereof.

54. (New) The display interface in accordance with claim 53, wherein said at least one scan parameter is operable to accept a default value.

55. (New) The display interface in accordance with claim 53, wherein said at least one scan parameter is operable to accept a user entered value.

56. (New) The display interface in accordance with claim 46, wherein said scan setting window initiates at least one type of scan to perform.

57. (New) The display interface in accordance with claim 56, wherein said at least one type of scan comprises at least one scan selected from the group consisting of: a two-dimensional scan, a combination scan, a three dimensional scan, a three-dimensional combination scan, a two-dimensional fast spin echo scan, and combinations thereof.

58. (New) A method for creating a pulse sequence used on a magnetic resonance imaging machine, said method comprising the steps of:

displaying a graphical user interface receiving input from a user and showing said pulse sequence;

receiving at least one sequence parameter from a user;

displaying a sequence tailor window in said graphical user interface;

displaying a sequence display window in the graphical user interface, said sequence display window displaying at least one of the group consisting of: radio frequency

characteristics of said pulse sequence, a slice select gradient graph, a signal acquisition graph, and a phase encoding graph;

receiving at least one command from the user to dynamically manipulate a graphical representation of said pulse sequence; and

displaying, in real time, visual feedback to the user of the manipulated pulse sequence.

59. (New) The method in accordance with claim 58, wherein said at least one sequence parameter is operable to accept a default value.

60. (New) The method in accordance with claim 58, wherein said at least one sequence parameter is operable to accept a user entered value.

61. (New) The method in accordance with claim 58, wherein said at least one sequence parameter is selected from the group consisting of: a gradient resolution parameter, a radio frequency pulse resolution parameter, an echo gathering time parameter, a sequence name parameter, at least one gradient motion compensation parameter, at least one radio frequency pulse characteristic parameter, and at least one data acquisition parameter.

62. (New) The method in accordance with claim 58, wherein said step of displaying a sequence tailor window further comprises the step of:

displaying at least one of a control section, a shape editor, a block editor, and a time scaler.

63. (New) The method in accordance with claim 62, wherein said step of displaying at least one of a control section, a shape editor, a block editor, and a time scaler further comprises the steps of:

activating said shape editor; and

modifying at least one of the radio frequency pulse characteristic parameters and the radio frequency pulse shape associated with said pulse sequence.

64. (New) The method in accordance with claim 62, wherein said step of displaying at least one of a control section, a shape editor, a block editor, and a time scaler further comprises the steps of:

activating said time scaler; and

displaying at least one vertical line through the graphically displayed pulse sequence for assisting the user in analysis of timing relations of the pulse sequence.


65. (New) The method according to claim 58, further comprising the step of: receiving at least one scan parameter from the user.

66. (New) The method in accordance with claim 65, wherein said at least one scan parameter is selected from the group consisting of: a number of slices parameter, a slice thickness parameter, a sequence repetition parameter, a number of phase encoding levels parameter, a discrete Fourier transform size parameter, a polarity flipping parameter, and combinations thereof.

67. (New) The method in accordance with claim 66, wherein said at least one scan parameter is operable to accept a default value.

68. (New) The method in accordance with claim 66, wherein said at least one scan parameter is operable to accept a user entered value.

69. (New) The method in accordance with claim 58, wherein said step of initiating a magnetic resonance imaging scan initiates at least one type of scan.

 70. (New) The method in accordance with claim 69, wherein said at least one type of scan comprises at least one scan selected from the group consisting of: a two dimensional scan, a combination scan, a three dimensional scan, a three dimensional combination scan, a two dimensional fast spin echo scan, and combinations thereof.
